Jet Propulsion Laboratory,
California Institute of Technology

SBIR / STTR Program Overview

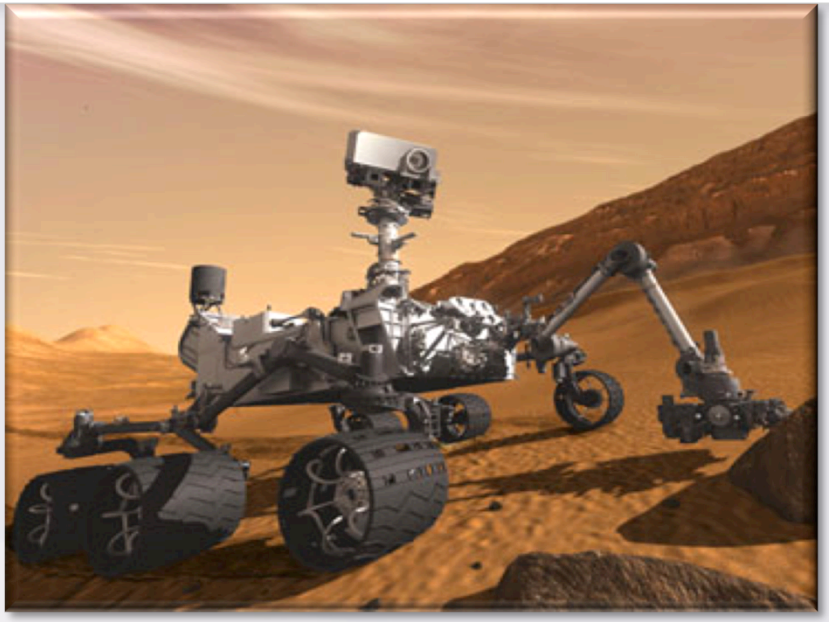
Mark Davidson
JPL SBIR Program Office

JPL SBIR in Space – Curiosity

Grammatech - Software for eliminating defects in mission-critical and embedded software applications directing rover operations

Starsys Research - Planetary gearboxes for the articulated robotic arm and the descent braking mechanism for controlling rate of descent to planetary surface

Creare - A space-qualified vacuum pump for the Sample Analysis at Mars (SAM) instrument package



ABOUT THE MISSION

The Mars Science Laboratory mission's Curiosity rover, the most technologically advanced rover ever built, landed in Mars' Gale Crater the evening of Aug. 5, 2012 PDT (morning of Aug. 6 EDT) using a series of complicated landing maneuvers never before attempted. The specialized landing sequence, which employed a giant parachute, a jet-controlled descent vehicle and a bungee-like apparatus called a "sky crane," was devised because tested landing techniques used during previous rover missions could not safely accommodate the much larger and heavier rover.

Curiosity's mission is to determine whether the Red Planet ever was, or is, habitable to microbial life. The rover, which is about the size of a MINI Cooper, is equipped with 17 cameras and a robotic arm containing a suite of specialized laboratory-like tools and instruments.

Yardney Technical Products – Lithium ion batteries that enable the power system to meet peak power demands or rover activities

Honeybee Robotics – Dust removal tool used to remove the dust layer from rock surfaces and to clean the rover's observation tray and designed the sample manipulation system for the Sample Analysis at Mars (SAM) instrument package

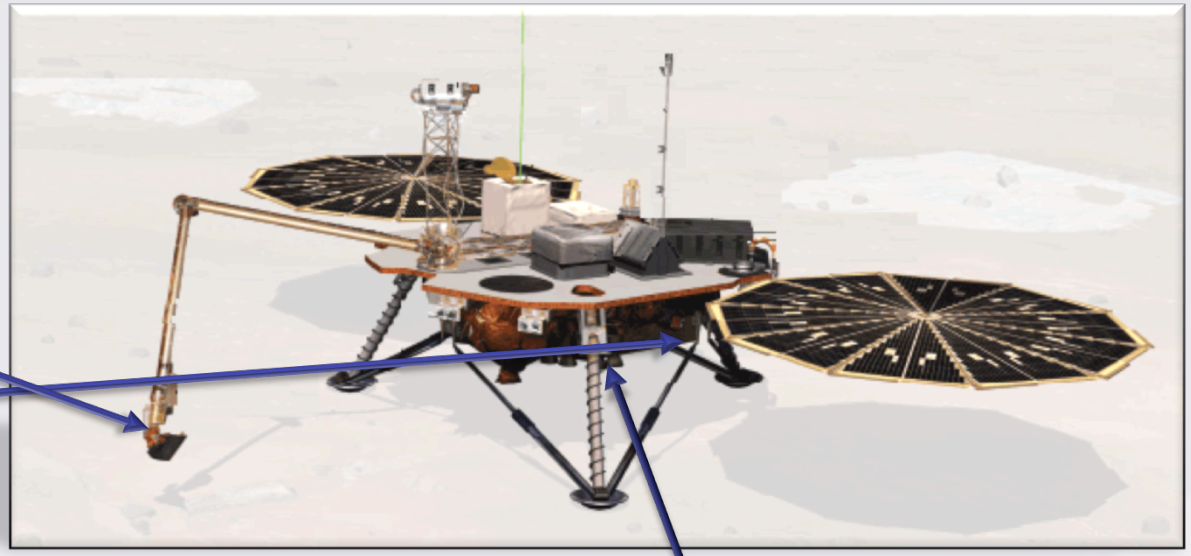
inXitu– Features of their automated sample handling system are implemented in the Chemistry and Mineralogy experiment (CheMin) instrument

NASA SBIR STTR

JPL SBIR in Space – Phoenix Mission

Icy Soil Acquisition Device supplied by **Honey Robotics, Inc.**

SpaceDev contributed wet chemistry elements of the Microscopy Electrochemistry and Conductivity Analyzer (MECA)



Lithium ion batteries supplied by **Yardney Technical Products, Inc.**

ABOUT THE MISSION

Phoenix was a lander sent to the surface of Mars to search for evidence of past or present microbial life. Using a robotic arm, it could dig up to half a meter into the Red Planet to collect samples and return them to onboard instruments for analysis. Besides verifying the existence of water-ice in the Martian subsurface, Phoenix discovered traces of the chemical perchlorate, a possible energy source for microbes and a potentially valuable future resource for human explorers.

As planned, the Phoenix lander ended communications in November 2008, about six months after landing, when its solar panels ceased operating in the dark Martian winter.

NASA SBIR STTR

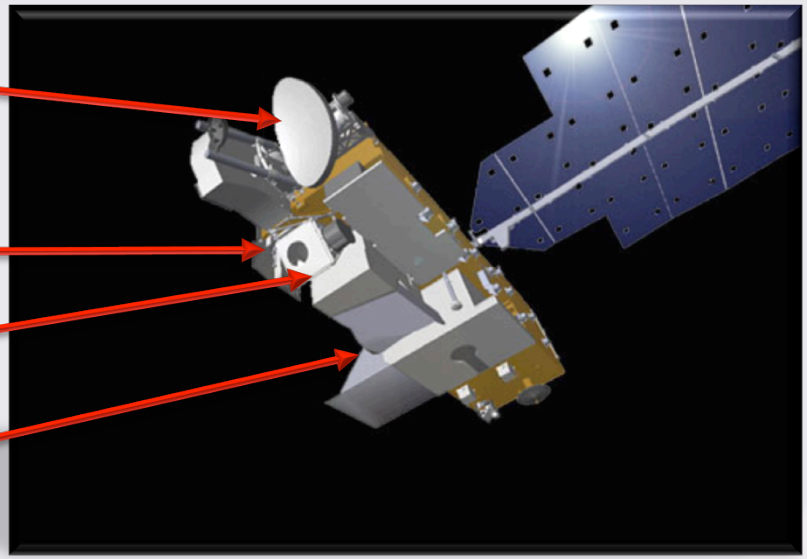
JPL SBIR in Space – Aura Mission

Composite Optics provided light weight, large aperture reflector of graphite reinforced composite material with high surface accuracy for the Microwave Limb Sounder (MLS)

DeMaria Electrooptics Under a $6.5 million contract with JPL, the company provided a terahertz radiometer for the MLS

Spaceborne supplied two correlator chips that make the analog to digital signal conversion and clean up the signal received by MLS

Lightwave Electronics provided two diode pumped solid state lasers for Tropospheric Emission Spectrometer (TES)



Seaspace Corporation
Developed low cost system that makes it possible for universities and other purchasers to receive the data transmissions from Aura

ABOUT THE MISSION

Aura (formerly EOS/Chem-1) is the chemistry mission of NASA with the overall objective to study the chemistry and dynamics of Earth's atmosphere from the ground through the mesosphere. The mission monitors the complex interactions of atmospheric constituents from both natural and man-made sources, such as biomass burning that effect the creation and depletion of ozone. The Aura mission provides global surveys of several atmospheric constituents which can be classified into anthropogenic sources (CFC types), radicals (e.g., ClO, NO, OH), reservoirs (e.g., HNO, HCl), and tracers (e.g., N2O, CO2, H2O). Temperature, geopotential heights, and aerosol fields will also be mapped.

NASA SBIR STTR

SBIR / STTR Program Overview

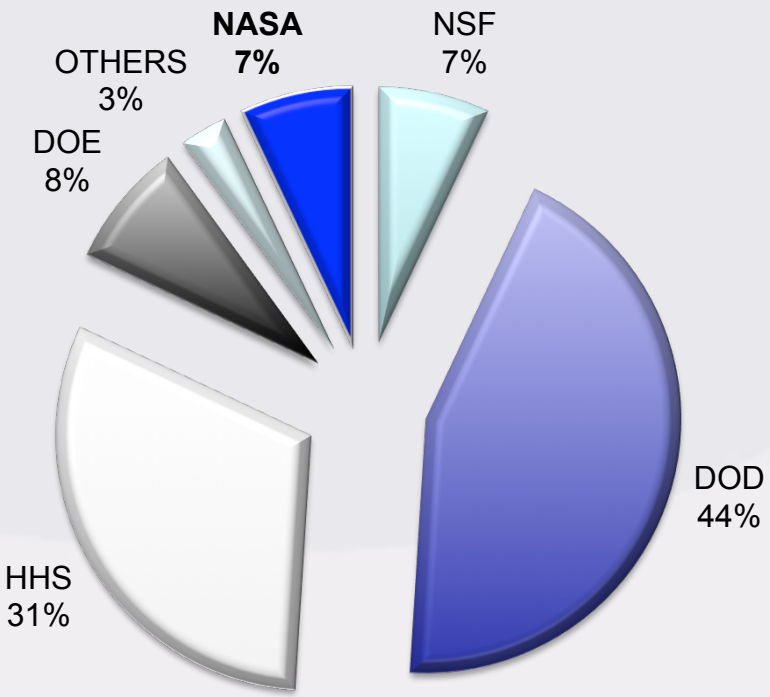
- The Small Business Innovative Research (SBIR) and Small Business Technology Transfer (STTR) program is authorized by Congress
  - Current authorization is through Fiscal Year (FY) 2017
- Overall program is administered by the Small Business Administration (SBA) in the Department of Commerce
- Federal Agencies with an annual extramural Research & Development (R&D) budget > $100 M participate
  - Agencies with > $1 B participate in the STTR program also
- Resources are “set aside” from an Agencies annual R&D appropriation to fund the program
- U.S. Government Agencies funded approximately $2.1 B in Fiscal Year 2014

Program Overview Cont'd

- Each Agency administers their own program under provisions of law and administrative direction from the SBA
- The SBA and its regional offices provide outreach, education and guidance to Small Business Concerns (SBCs)
  - Workshops, Newsletters, Seminars, Webcasts
  - Mentoring to SBCs by the Service Corp of Retired Executives (SCORE)
- Agencies provide their own outreach in concert with the SBA
  - Focus on businesses owned by women, veterans, disabled
  - SBCs in identified economically disadvantaged locations
- SBA sponsored "bus tours" of under represented geographies
- Visit https://www.sba.gov/

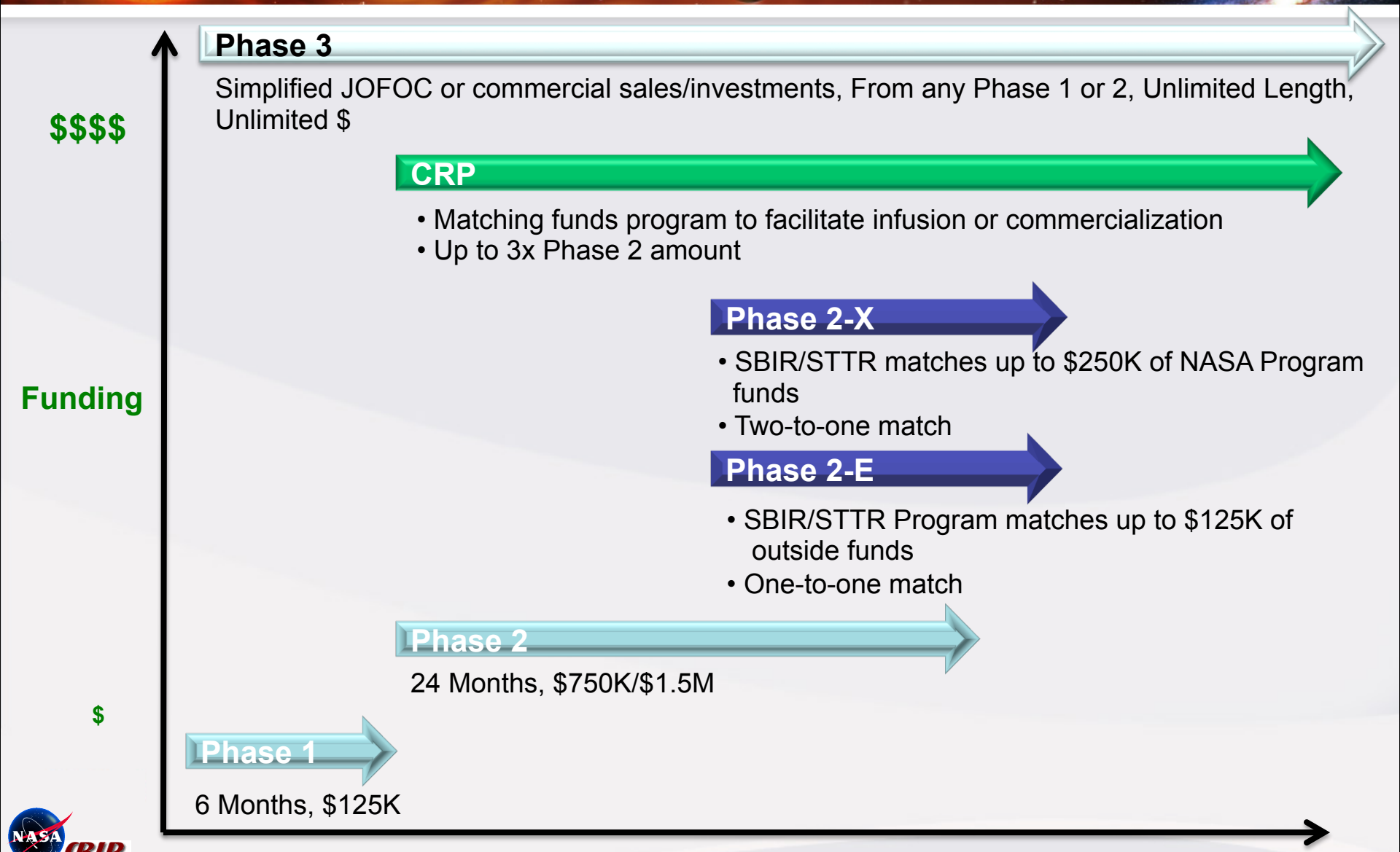
Federal Agency Funding

SBIR and STTR	SBIR Only
DOD - $1,000M	USDA - $18M
HHS - $697M	DHS - $16M
NASA - $191M	ED - $13M
DOE - $184M	DOT - $8M
NSF - $153M	DOC - $7M
	EPA - $4M

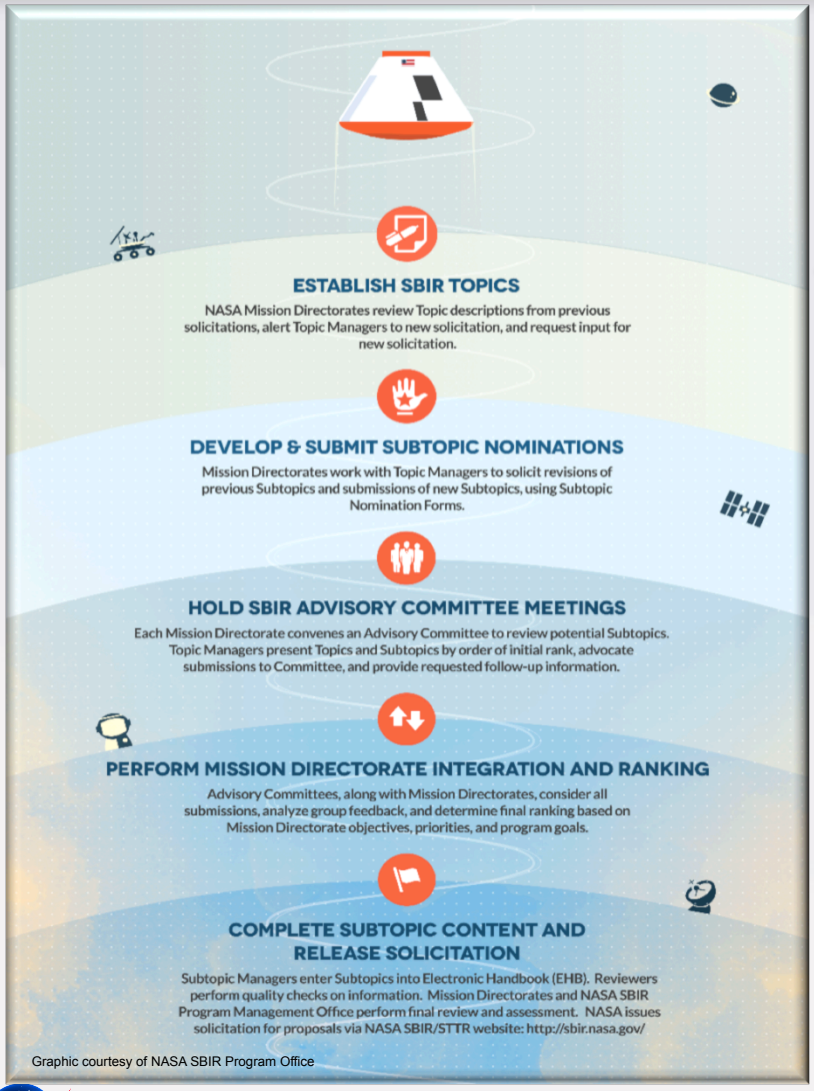


- SBIR projects and dollars have a presence in all 50 states from a wide number of Federal Agencies
- From 2010 – 2014 – over 29,600 contracts valued at over $ 11.1 billion have been issued to SBC's across the nation

Phases of the NASA Program



Topic Generation



Graphic courtesy of NASA SBIR Program Office

FY14: Fourth Quarter	November 2014	FY15: Second Quarter	FY15: Third Quarter
With Mission Directorates and Centers- define Subtopics for annual Solicitations	Release annual SBIR and STTR Solicitations	Phase 2 selections from FY 2014 Awards	Phase 1 selections from 2015 Solicitations
Phase 3 Identified throughout the Year			

Examples of Topics in the 2015 Solicitation include:

- Advanced Telescope Systems
- Spacecraft & Platform Subsystems
- Autonomous and Robotic Systems
- Sensors, Detectors and Instruments
- Information Technology
- Advanced Power & Energy Storage
- Lightweight Materials, Structures & Advanced Manufacturing/Assembly

Solicitation & Selection

FY14: Fourth Quarter	November 2014	FY15: Second Quarter	FY15: Third Quarter
With Mission Directorates and Centers- define Subtopics for annual Solicitations	Release annual SBIR and STTR Solicitations	Phase 2 selections from FY 2014 Awards	Phase 1 selections from 2015 Solicitations
Phase 3 Identified throughout the Year			

- Contracts are fixed price to be completed on a “best effort” basis
- Company owns the resulting intellectual property (IP)
- Government has royalty-free rights for government use of company IP
- Government protects company data from public dissemination for four years after end of the contract
- Contracts require compliance with ITAR and EARs

Proposal Tips

- Review prior years solicitations at http://sbir.nasa.gov/
- Search and identify specific technical areas (subtopics) and lead center(s) of your interest
- Request subject matter expert contact information from respective field center program POCs
- E-mail/Call technical POCs and initiate dialogues
- Learn technology needs, priorities, and funding gaps
- Visit and brief NASA on your companies capabilities, if the opportunity presents itself
- **Please note** – once a solicitation is active, NASA (too include JPL) and its centers are not permitted to discuss the active solicitation

SBIR / STTR SBC Criteria

SBIRs

- Organized for-profit U.S. small business (500 or fewer employees)
- At least 51% U.S. owned and independently operated
- SBC located in the U.S.
- Principal Investigator's (PI) primary employment must be with the SBC during the project
- For Phase I, no more than 1/3 of funding (less profit) can be subcontracted, 1/2 for Phase II

STTRs

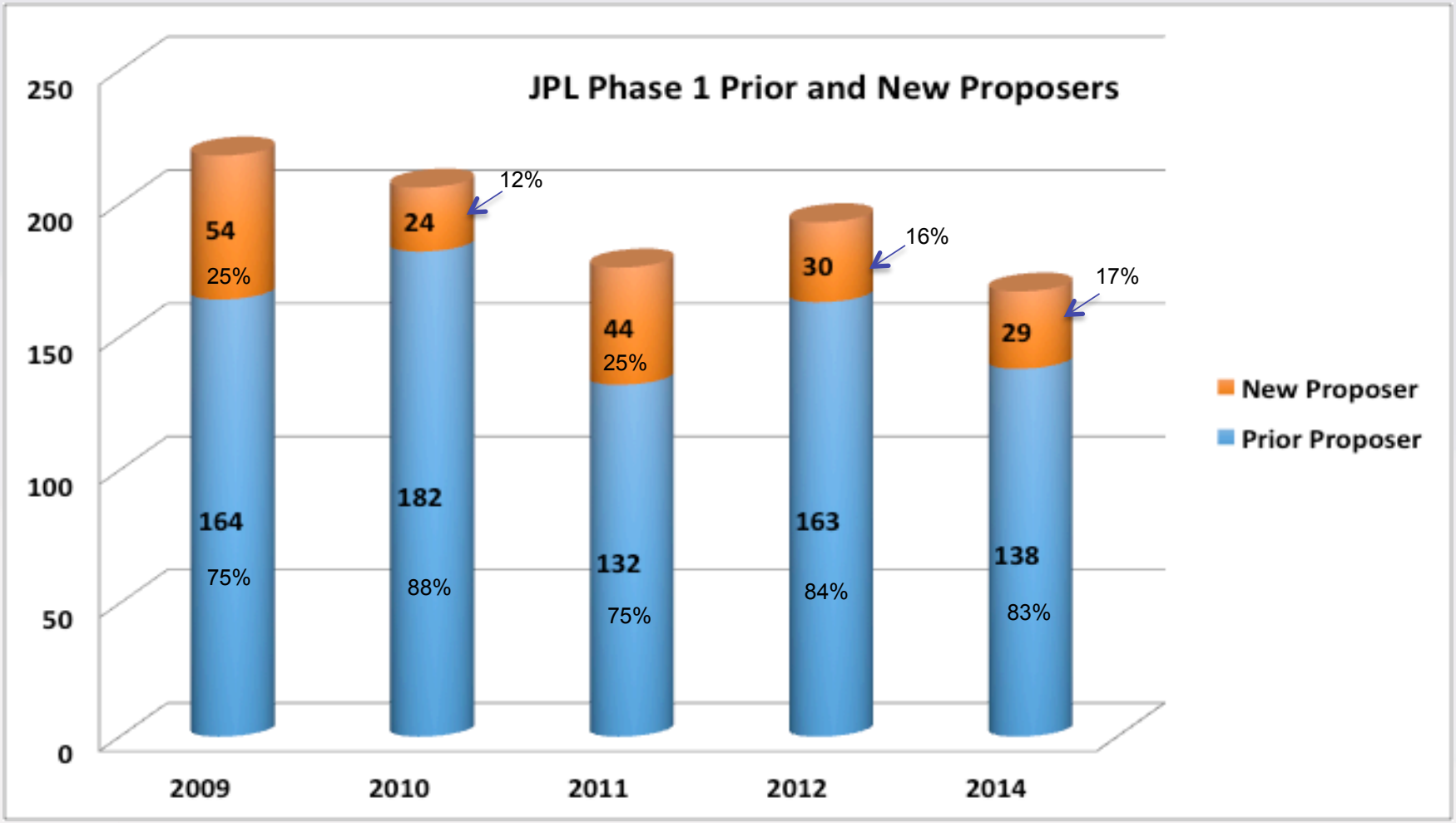
- SBC must perform a minimum of 40% of the work; research institution (RI) a minimum of 30%
- A RI is a FFRDC, college or university, or non-profit research institution
- No size limit on research institution
- SBC must manage and control the STTR funding agreement
- PI may be at the small business or research institution

Important to Remember . . .

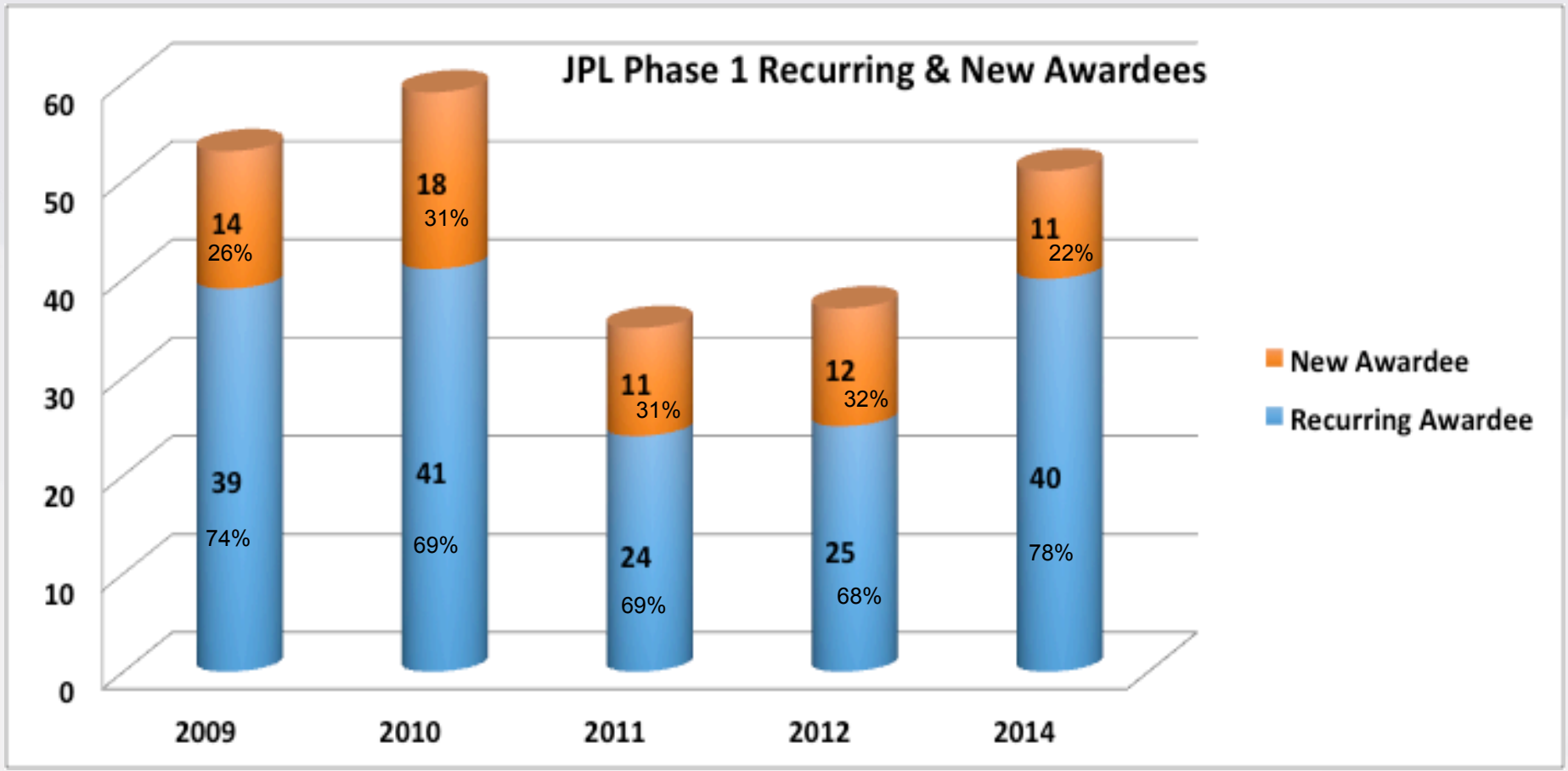
- *All* required items of information must be contained in your proposal – *please carefully follow directions*
- Observe proposal submission *deadlines*, *content* (page count) and *formatting rules*
- Eligibility is determined at time of the award
- The PI is *not* required to have a Ph.D.
- The PI *is* required to have expertise to oversee project scientifically and technically
- Applications may be submitted to different agencies for *similar work*
- Awards may ***not*** be accepted from different agencies ***for duplicative projects***
- Do not plan on using Government facilities *unless* they are not available in the private sector

JPL Odds of Selection

JPL New & Recurring Proposers Phase 1



JPL New & Recurring Phase 1 Awards

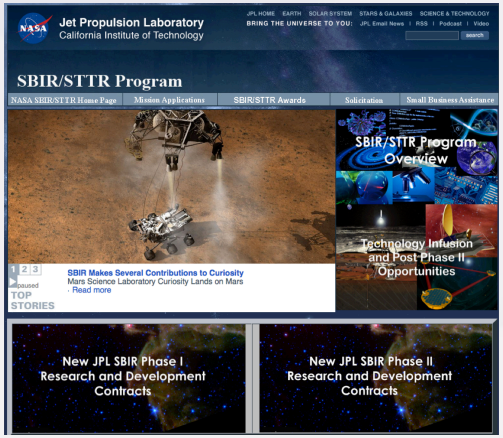


SBC – NASA / JPL Resources

- For complete program overview and current information, go to http://sbir.nasa.gov/

- Contact JPL
  - Science Mission Directorate
    - Dr. Richard Terrile
    - (818) 354 6154
    - Richard.J.Terrile@jpl.nasa.gov
  - JPL Technology Infusion
    - Dr. Carol Lewis
    - (818) 354 3767
    - Carol.R.Lewis@jpl.nasa.gov
  - SBIR/STTR Outreach & Administration
    - Mark Davidson
    - (818) 354 1246
    - Mark.H.Davidson@jpl.nasa.gov

- Visit JPL's SBIR page at http://sbir.jpl.nasa.gov/



SBC - Local Resources

Assistance for Small Businesses

JPL SBIR/STTR Program Office Technology Infusion Manager

Assistance identifying contacts, infusion opportunities and availble resources through the SBIR/STTR Program

California Small Business Development Centers

Provides business assistance to start-up & existing businesses

Other States

State support for small businesses including financial assistance, training and technical assistance

JPL Business Opportunities Office

JPL program designed to afford small business the opportunity to compete for contracts, and to place the maximum number of contracts for supplies and services with them.

California Manufacturing Technology Center (CMTC)

CMTC Provides manufacturing and distribution consulting services to improve California's Industrial base.

Venture Capital Information

Trade association that represents the U.S. venture capital industry.

Advice & Suggestions

- Plan ahead
  - Look to previous year NASA solicitations and awards
  - Organize your team – PI, RI, subcontractors / consultants
- Reach out
  - Contact the appropriate Mission Directorate or Center
  - Arrange for discussions via contact with Technical Community
  - Once NASA SBIR/STTR solicitation is released (active) – *there is no further contact* permitted regarding the active solicitation
    - Contact is permissible on past solicitations and activity not related to the active solicitation
- Read and comply with solicitation guidelines
  - Meet your deadlines
  - Comply with formatting requirements
- Post award – ask for a debriefing